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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,239	04/23/2004	Huilong Zhu	FIS920030375	3238

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EXAMINER

LUU, CHUONG A

ART UNIT	PAPER NUMBER
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2818

MAIL DATE	DELIVERY MODE
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06/26/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/709,239

Applicant(s)

ZHU ET AL.

Examiner

Chuong A. Luu

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 4/13/2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 14-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-13 have been considered but are moot in view of the new ground(s) of rejection.

PRIOR ART REJECTIONS

Statutory Basis

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The Rejections

Claims 1-2 are rejected under 35 U.S.C. 102(e) as being anticipated by Liu et al. (U.S. 20040195624).

Liu discloses a strained silicon FinFET with

(1) a silicon on insulator substrate (1);

a stacked gate structure of an SiGe, a strained Si, an oxide layer and a polysilicon gate (see Figures 1-3);

(2) wherein stress is produced in the stacked gate structure by different semiconductor materials (see Figures 1-3).

PRIOR ART REJECTIONS

Statutory Basis

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The Rejections

Claims 3-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. (U.S. 20040195624) in view of Zhu et al. (U.S. 20050189589).

Liu teaches everything above with the exception of having both nFET devices and PFET devices, and wherein the NFET devices and PFET devices have different stresses. However, Zhu discloses a semiconductor transistor with (3) the device fabricated on a chip having both nFET devices and PFET devices, and wherein the NFET devices and PFET devices have different stresses (see paragraph [0027]); (4) wherein the stacked gate structure of the nFET devices comprises the second stressed film layer of strained SiGe over the first stressed film layer of single crystal silicon, and the stacked gate structure of the PFET devices comprises the second stressed film

layer of strained Si:C over the first stressed film layer of single crystal silicon (see paragraph [0027]); **(5)** wherein the stacked gate structure of the nFET devices comprises the second stressed film layer of strained $\text{Si}_{1-y}\text{Ge}_y$ over the first stressed film layer of strained $\text{Si}_{1-x}\text{Ge}_x$, and the stacked gate structure of the PFET devices comprises the second stressed film layer of strained $\text{Si}_{1-z}\text{Ge}_z$ over the first stressed film layer of strained $\text{Si}_{1-x}\text{Ge}_x$, wherein $y > x$ and $z < x$ to produce different stresses (see paragraph [0027]); **(6)** wherein the value of x is selected to adjust the PFET V_t (threshold voltage) (see paragraph [0027]); **(7)** wherein the $\text{Si}_{1-x}\text{Ge}_x$ is a seed layer for parts of the gate above the $\text{Si}_{1-x}\text{Ge}_x$ layer, and the $\text{Si}_{1-x}\text{Ge}_x$ layer is strained after selective epitaxial growth (see paragraph [0027]); **(8)** wherein the stacked gate structure of the nFET devices comprises the second stressed film layer of strained $\text{Si}_{1-y}\text{Ge}_y$ over the first stressed film layer of strained $\text{Si}_{1-x_n}\text{Ge}_{x_n}$, and the stacked gate structure of the PFET devices comprises the second stressed film layer of strained $\text{Si}_{1-z}\text{Ge}_z$ over the first stressed film layer of strained $\text{Si}_{1-x_p}\text{Ge}_{x_p}$, wherein $y > x_n$ and $z < x_p$, to produce stresses (see paragraph [0027]); **(9)** wherein the $\text{Si}_{1-x_n}\text{Ge}_{x_n}$ is a seed layer for parts of the gate above the $\text{Si}_{1-x_n}\text{Ge}_{x_n}$ seed layer and the $\text{Si}_{1-x_n}\text{Ge}_{x_n}$ seed layer seed layer is strained after selective epitaxial growth, and the $\text{Si}_{1-x_p}\text{Ge}_{x_p}$ is a seed layer for parts of the gate above the $\text{Si}_{1-x_p}\text{Ge}_{x_p}$ seed layer and the $\text{Si}_{1-x_p}\text{Ge}_{x_p}$ seed layer is strained after selective epitaxial growth (see paragraph [0027]); **(10)** wherein the stacked gate structure of the nFET devices comprises the second stressed film layer of strained $\text{Si}_{1-y}\text{Ge}_y$ over the first stressed film layer of strained $\text{Si}_{1-x}\text{Ge}_x$, and the stacked gate structure of the PFET devices comprises the second stressed film layer of strained

Si:C over the first stressed film layer of strained $\text{Si}_{1-x}\text{Ge}_x$, wherein $y > x$ and $z < x$, to produce different stresses (see paragraph [0027]); **(11)** the device fabricated in an integrated circuit PFET devices having comprising both nFET devices and said stacked gate structure (see paragraph [0027]); **(12)** the device fabricated in an integrated circuit comprising nFET devices having said stacked gate structure (see paragraph [0027]); **(13)** the device fabricated in an integrated circuit comprising PFET devices having said stacked gate structure (see paragraph [0027]). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the teaching of Liu (accordance with the teaching of Zhu). Doing so would facilitate the manufacture of the semiconductor device and improve the speed of the semiconductor device.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chuong A. Luu whose telephone number is (571) 272-1902. The examiner can normally be reached on M-F (6:15-2:45).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven H. Loke can be reached on (571) 272-1657. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Chuong Anh Luu
Patent Examiner
June 18, 2007